

Space News Roundup

Vol. 23 No. 2

January 27, 1984

National Aeronautics and Space Administration

Payload specialists for SL-4 flight named

Four scientists have been named by NASA to train as payload specialists for Spacelab 4, the first Spacelab mission dedicated to life sciences. Spacelab 4 is scheduled to fly on Shuttle mission 61-D now set for January 1986.

Those named are: Dr. Millie Hughes Wiley Fulford, Veteran's Administration Hospital and University of California, both in San Francisco; Dr. Francis Andrew Gaffney, University of Texas Health Science Center, Southwestern Medical Center, Dallas; Dr. Robert Ward Phillips, Colorado State University, Ft. Collins; and Dr. Bill Alvin Williams, Environmental Protection Agency, Corvallis, Ore.

Prior to the seven-day mission, two of the four candidates will be selected to fly on the Spacelab to conduct experiments. The other two payload specialists will serve as flight alternates and as members of the mission management and science team responsible for controlling and directing experiment operation from the ground.

The Spacelab 4 payload specialists were selected by the Investigators Working Group, consisting of the principal investigators (scientists) responsible for each of the experiments on the mission. Chairman of the IWG is NASA

Mission Scientist Dr. John Rummel of JSC. Program manager is Sterling Smith, Space Sciences and Applications Office, Washington, D.C.

Dr. Fulford is currently an Assistant Professor of Biochemistry at the V.A. Medical Hospital and an associate professor at the University of California, both in San Francisco. She received her bachelor's degree from Tarleton State University, Stephenville, Texas, in 1968 and her doctorate from Texas Women's University, Denton, in 1972.

Dr. Gaffney is currently an Assistant Professor of Medicine and Cardiology at the University of Texas Health Science Center, Southwestern Medical School, Dallas. He received his bachelor's degree from the University of California, Berkeley, in 1968 and his medical degree from the University of New Mexico in 1972.

Dr. Phillips is currently an Assistant Professor at Colorado State University, Ft. Collins. He received his bachelor's and doctor of veterinary medicine degrees from Colorado State University in 1961, and his Ph.D. from the University of California, Davis, in 1964.

Dr. Williams is currently a Research Scientist/Group Leader, (Continued on page 2)

OV-102 to undergo mods at Palmdale

The Orbiter *Columbia* is on the way from the Kennedy Space Center back to the final assembly facility at Palmdale, CA for modifications prior to its next flight in August of this year.

Columbia has now logged six space flights, and some mission-peculiar modifications will be required to support its next flight, 41-G. Those mods will include payload bay changes to support the 41-G payloads, a full EVA operational slidewire and other changes. The liquid oxygen engine cutoff sensor also will be relocated from the external tank to the Orbiter, a standard feature on *Challenger* and *Discovery*. *Columbia* also will be fitted with wing load instrumentation to gain additional flight

data on wing loading.

Columbia was flown to Edwards Air Force Base aboard the Shuttle Carrier Aircraft after STS-9 post-flight servicing at the Cape. She was then towed overland to Palmdale.

The Orbiters *Challenger* and *Discovery* are at the Kennedy Space Center. *Challenger* is on Pad 39-A in preparation for the launch of Flight 41-B on Feb. 3. *Challenger* is scheduled for five missions this year. *Discovery* is in the Orbiter Processing Facility being prepared for her maiden voyage in June on Flight 41-C. *Discovery* is slated for four missions in calendar year 1984. The Orbiter *Atlantis* is under construction and scheduled for delivery to NASA next year.



The Orbiter *Columbia* streaks across the English countryside in this exceptional photo taken Nov. 28 during the second orbit of the STS-9/Spacelab mission from Havant, Hampshire, England. Photographer H. J. P. Arnold, who runs a space photographic and information service, used a Nikon F3 with an f2.8, 24mm wide angle lens and Kodak Tri-X film to capture the scene. His camera was tripod-mounted and the exposure was one minute. (Photo courtesy Space Frontiers Ltd., Copyright 1983.)

JSC access

Changes due on Ave. B with new road completion late in '84

If you use the back gates at JSC, stand by for some changes by this time next year: Space Center Blvd. is on the way to becoming some 11,700 feet longer as it links up with NASA Road One, and both entrances to the Center along Ave. B are slated for modification.

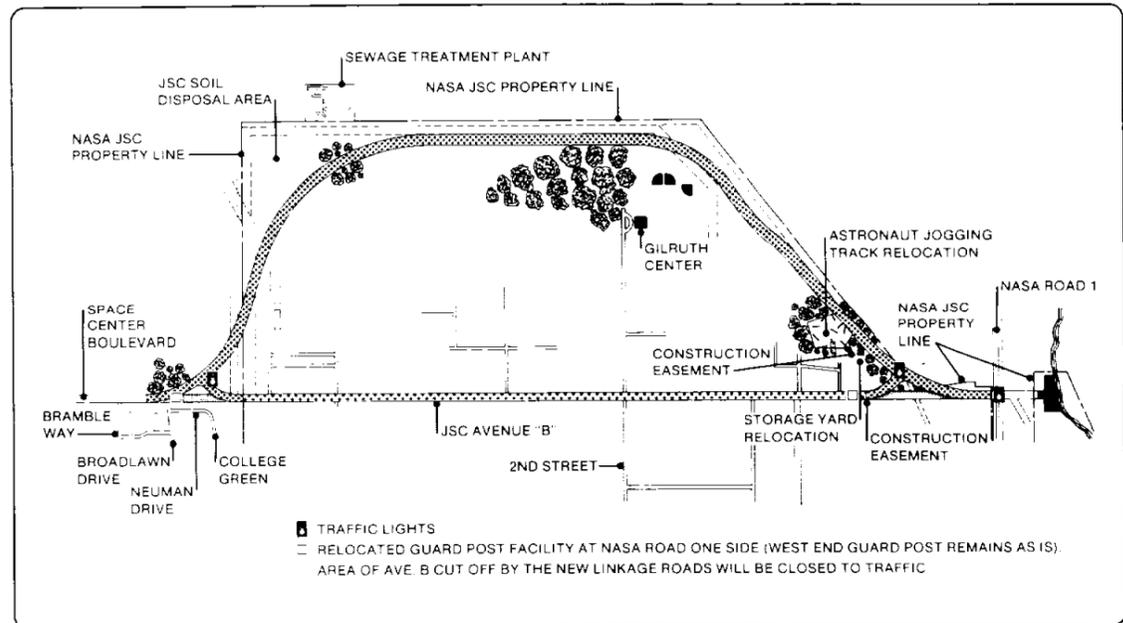
The changes are due as part of a new \$3.07 million county road project now under construction along JSC's northern perimeter which will link Bay Area Blvd. and NASA Road One. Bids for the project opened last July 28 after a \$4 million county bond issue had been passed. The two-lane extension will have land available along a 135-foot easement for later addition of two more lanes if that becomes necessary. Instead of curbs, gutters and underground drainage, budget-minded plans call for open ditches and culverts. The project is scheduled for completion

by the end of this year.

The extension to Space Center Blvd. begins near Skywalker just west of the Center at the north border of the University Green subdivision. From that point, the new road will swing northeast, cross the cooling canal on JSC's west boundary, then run parallel to Ave. B behind the Gilruth Recreation Center area. On the eastern side of the Center, the road will swing south again to meet NASA Road One at the present entrance to Ave. B.

Two four-lane linkage roads at either end of the new east-west thoroughfare will provide access to Ave. B. Three traffic lights are to be added: one which is already in place at the NASA One—Ave. B intersection and one where each linkage road joins the extended Space Center Blvd. In addition, a

(Continued on page 2)



Space News Briefs

Marshall issues OMV proposal request

The Marshall Space Flight Center has issued a Request for Proposals inviting aerospace companies to define their concepts for an Orbital Maneuvering Vehicle, a kind of smart space tug that would move satellites and other orbiting objects from place to place in high orbits above the Earth. The aerospace community has until Feb. 14 to respond, after which Marshall will select three or more firms for 12-month parallel definition study contracts of from \$1.7 to \$1.9 million for each company selected. Should a decision be made to actually build the OMV, now proposed for initial flights in the early 1990s, one of the companies involved in these studies would be chosen to build the flight hardware.

ICE probe heads for comet encounter

With a new name and a new mission, a recycled space probe launched in 1978 hurtled within 72 miles of the Moon's dark side Dec. 12 and is now headed for a deep space rendezvous with the Comet Giacobini-Zinner on Sept. 11, 1985. The probe, formerly called ISEE-3 (the third International Sun Earth Explorer) was renamed ICE (the International Cometary Explorer) when it left the Earth-Moon system. ICE is now traveling at one mile per second away from the Earth and is being tracked on the 65-meter dish of the Deep Space Network. It will be 44 million miles away from Earth when it flies through the tail of Giacobini-Zinner, measuring magnetic fields and particles and gas ions that form the comet's tail. After the encounter, it will continue on course until March 1986 and a more distant encounter with Halley's Comet.

Commercial Delta launches negotiated

NASA has invited Transpace Carriers, Inc. of Washington, D.C. and Greenbelt, MD, to enter into negotiations leading to the establishment of a commercial Delta launch vehicle program which could begin as early as next year. Negotiations of a preliminary agreement which would give TCI exclusive Delta marketing rights and the right to initiate commercial production are expected to begin in the next several weeks. NASA will complete its 1984 Delta launch schedule as planned, with the possibility that TCI could take over in 1985. The move is part of an overall strategy to transfer U.S. Government expendable launch vehicle systems to the private sector.

Sikorsky to build X-Wing

United Technologies' Sikorsky Aircraft Division will use the NASA Rotor Systems Research Aircraft as a testbed for a revolutionary new helicopter rotor concept called the X-Wing. The four-bladed X-Wing rotor operates much like a standard helicopter rotor for vertical and low-speed flight. In forward flight, however, the rotor can be stopped so that it forms an "X" over the top of the fuselage and provides lift for high-speed forward flight. This technology is expected to lead to a new generation of helicopters which will operate at higher altitudes and fly up to three times faster than present models. A \$77 million cost plus incentive fee contract was awarded Sikorsky by the Ames Research Center. The X-Wing program is being jointly sponsored by NASA and the Defense Advanced Research Projects Agency.

Langley sees merit in surface grooving

Barely visible grooves on the surfaces of aircraft may help to tame drag-producing air turbulence and increase fuel efficiency, according to experiments conducted at the Langley Research Center. The grooves might be no more than two-thousandths of an inch deep, but deep enough, Langley researchers think, to favorably alter turbulent flow and reduce by as much as 10 percent the total aerodynamic drag on an aircraft. A 10 percent drag reduction could translate to a potential savings of from \$200 to \$300 million annually for the U.S. commercial airline fleet. Small scale results obtained in wind tunnel tests using the grooves, or "riblets," could soon be tested in actual flight conditions. If the concept continues to prove itself, researchers say, the first flight test could come in 18 to 24 months.

Bulletin Board

Mineral show to feature JSC speakers

The 9th Annual Clear Lake Gem and Mineral Show, set for Feb. 18 and 19 at the Pasadena Convention Center, will feature speakers Dr. John W. Dietrich of JSC's Solar System Exploration Division and Dr. Elbert A. King, former Curator of the JSC Lunar Receiving Laboratory. Also on the same program is Dr. Peter H. Shultz, Senior Staff Scientist and Director of the Planetary Image Center at the Lunar and Planetary Institute. Dietrich will discuss "The Geology of the Big Bend Region of Texas." King will discuss "Texas Gemstones" and Shultz will discuss "The Earth: Yesterday, Today and Tomorrow—Clues from Other Planets." The show is sponsored by the non-profit Clear Lake Gem and Mineral Society. For more information, call John Dornbach at 334-3459.

Firewood available, courtesy Alicia

When Hurricane Alicia roared through the area last August, one of the things she left in her path was a great big slew of dead and damaged trees on the back 40 at JSC. Some of the wood from those trees is still available to JSC employees and contractors, free of charge. As dry weather permits, officials plan to have the wood cut, split and stacked near the Gilruth Recreation Center. Due to insurance considerations, no cutting or splitting is allowed on site except by authorized persons. The wood should be ready to load in a week or so, and you can call Jack Brown at the Rec Center, x3594, to find out when and where to pick it up.



Work is underway on the new perimeter road, but completion is several months away.

New Road

(Continued from page 1)

stop sign will be placed on Space Center at Broadlawn, according to Harris County spokesman Dick Turner. Traffic lights at access points to JSC will have protected turns in and out of the Center, according to Glenn Spencer, a civil engineer who is Technical Assistant in the Facilities Design Division.

The guard post at the west end of Ave. B will remain where it is, but the post now at NASA One will be moved back several hundred feet to the point where the linkage road meets Ave. B. That gate, now closed due to the separate construction project underway along NASA Road One, will not be reopened until both road projects

are completed at the end of this year.

A fence running the entire length of the south side of Space Center will effectively become JSC's new northern boundary, although the fence at the Center's true northern property line will remain in place.

Another modification will be the relocation of the astronaut jogging track slightly to the west of its present location behind Bldg. 260. The track will still have a quarter-mile circumference, and a path bisecting the irregularly-shaped circle will be added as a result of leaving the west leg of the existing track in place.

As of last week, the roadbed itself had been cut and cleared,

although surfacing work has not begun. One of three culverts bridging the cooling canal—a major part of the new construction—is almost complete. Under a separate state project, NASA One is being raised from an elevation of 6.5 feet above mean sea level to the required minimum of 10 feet. The minimum elevation of the new portion of Space Center will also be 10 feet. Elevation of roads on-site are already higher than that, according to Spencer.

Deer living within JSC's perimeter fence—descendants of the original herd which roamed the property and was fenced in back in the early 1960s—are not expected to be affected by the new road.

Shop Talk

Rafael Garcia, an aerospace engineer in the Experiments Operations Support Division at JSC, was recently presented with the 1983 Hispanic Achievement Award by the Houston Federal Executive Board. Garcia was recognized for his work both on the Space Shuttle program and for his personal interest in promoting Hispanic career development efforts at JSC. The award is presented annually to the individual who has made the most significant contribution toward furthering the goals of the Hispanic Employment Program among federal agencies in the Houston area. Garcia has

made presentations to junior and senior high classes in Puerto Rico, has served as the subject of a NASA film on Hispanic career opportunities and has made it a practice to seek out prospective employees and co-ops and interns employed at JSC to help them orient themselves to the system.

Dr. William F. Ballhaus Jr. has been named Director of the Ames Research Center, replacing outgoing Director C.A. "Sy" Syverston, who retired earlier this month after 35 years of federal service. Ballhaus was formerly the Director of Aeronautics at Ames, a post he has held since 1980. Ballhaus, who received his Ph.D. in engineering from the University of California at Berkeley in 1971, is regarded as a pioneer in the development of numerical methods and computer codes for predicting transonic flow fields on different aerodynamic designs.

Payload specialists

(Continued from page 1)

Toxicology, for the U.S. Environmental Protection Agency, Corvallis, Ore. He received his bachelor's degree from the University of California, Berkeley, in 1963 and his master's and doctorate from the University of Illinois in 1968.

NASA's Office of Space Science and Applications has overall responsibility for all NASA Spacelab missions. The Johnson Space Center, Houston, is the NASA center with management responsibility for the Spacelab 4 mission. Ames Research Center, Mountain View, Calif., also has responsibility for several of the experiments in the Spacelab 4 payload.



Dr. Joseph Kerwin, the new Director of Space and Life Sciences, presented 56 employees with performance and service awards Jan. 12. Dr. Kerwin recently returned from Australia, where he served as NASA's Senior Scientific Representative.

Cookin' in the Cafeteria

Week of January 30 - February 3, 1984

Monday: Cream of Potato Soup; Franks & Sauerkraut, Stuffed Pork Chop, Potato Baked Chicken, Meat Sauce & Spaghetti (Special); French Beans, Buttered Squash, Buttered Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Navy Bean Soup; Beef Stew, Liver & Onions, Shrimp Creole, Smothered Steak w/Dressing (Special); Corn, Rice, Cabbage, Peas.

Wednesday: Seafood Gumbo; Roast Beef, Baked Perch, Chicken Pan Pie, Salmon Croquette (Special); Mustard

Greens, Italian Green Beans, Sliced Beets.

Thursday: Beef & Barley Soup; Beef Tacos, Diced Ham w/Lima Beans, Stuffed Cabbage (Special); ranch Style Beans, Brussels Sprouts, Cream Style Corn.

Friday: Seafood Gumbo; Fried Shrimp, Deviled Crabs, Ham Steak, Salisbury Steak (Special); Buttered Carrots, Green Beans, June Peas.

Week of February 6-10, 1984

Monday: Cream of Chicken Soup; Beef Burgundy over Noodles, Fried Chicken, BBQ Sausage Link, Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried

Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli Buttered Squash.

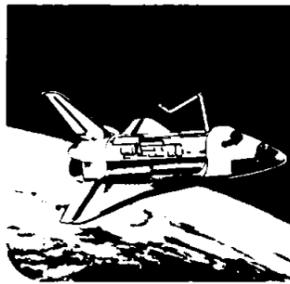
Wednesday: Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

Thursday: Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

Friday: Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

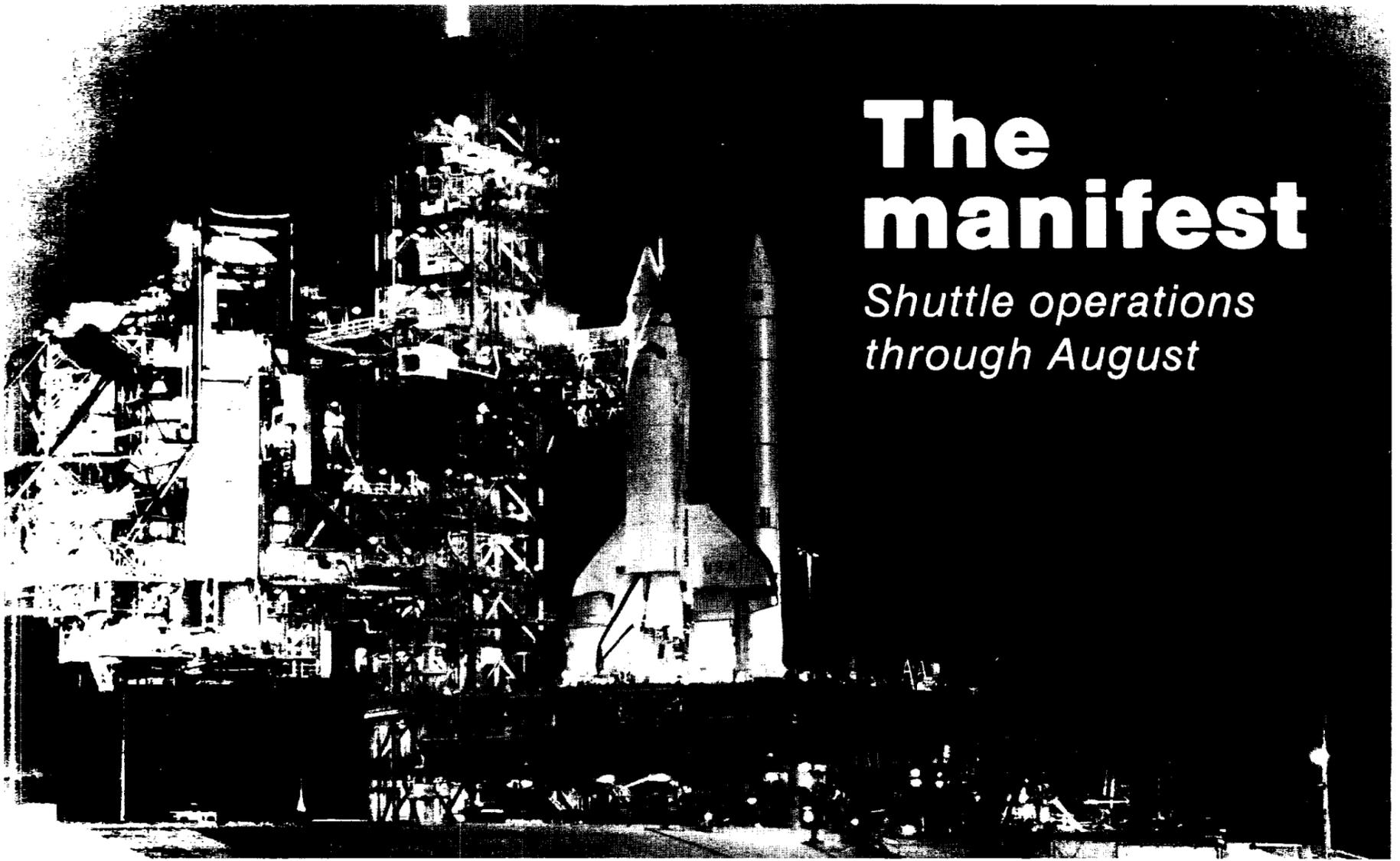
NASA
Lyndon B. Johnson Space Center

Space News Roundup



The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. **Roundup** deadline is the first Wednesday after publication.

Editor: Brian Welch
Asst. Editor: Betty Johnson



The manifest

Shuttle operations through August

Launch: April 4
Duration: 8 days
Orbiter: 099
Altitude: 250 n.m.
Inclination: 28.5 degrees
Crew: Crippen, Scobee, Hart, Van Hoften, Nelson
Payloads: LDEF, SMRM/FSS, SSIP, Cinema 360, IMAX

41-C

Launch: July 7, 1984
Orbiter: 099
Crew: Mattingly, Shriver, Onizuka, Buchli, DOD specialist

41-E

Flight 41-E will be the second Shuttle mission for the Department of Defense.

Launch: August 9
Duration: 7 days
Orbiter: 103
Altitude: 160 n.m.
Inclination: 28.45 degrees
Crew: Bobko, Williams, Seddon, Hoffman, Griggs
Payloads: SPARTAN-1, SBS-D, SYNCOM IV-2, TELESTAR 3-C, ADSF

41-F

More than any other single flight, this mission will set the tone for space operations through the end of this century. After a 9:05 a.m. EST launch and the first direct insertion to orbit, the crew of *Challenger* will deploy the Long Duration Exposure Facility, a 22,000-pound free flyer, on Flight Day 2. LDEF gives passive experiments a long term (at least six month) exposure to space. On Flight Day 3, *Challenger* will have moved to close proximity with the ailing Solar Maximum Mission satellite, and over the next three days repair operations will commence. The rendezvous, repair and redeploy of Solar Max will nominally occur on Flight Days 3 and 5, with a rest on Flight Day 4. The SMRM/FSS is the Flight Support Structure—cradle, hardware and electronics—for the Solar Max Repair Mission. The SSIP is a Shuttle Student Involvement Project yet to be named at press time, and Cinema 360 and IMAX are two high quality motion picture techniques which will be used to document portions of the mission. Landing is set for KSC at 8:15 am. CST on Flight Day 7.

Launch: June 4
Duration: 7 days
Orbiter: 103
Altitude: 173/121 n.m.
Inclination: 28.45 degrees
Crew: Hartsfield, Coats, Resnik, Hawley, Mullane, Walker
Payloads: CFES Block 3, LFC, OAST-1, SYNCOM IV, TELESAT-1, Cinema 360, IMAX, SSIP

41-D

NASA's third Shuttle Orbiter, the *Discovery*, will make her maiden voyage on this flight, just one in a series of firsts for 41-D. SYNCOM IV, a Hughes satellite leased to the U.S. Navy, will mark the first "frisbee" deploy, as it has its own unique upper stage (a modified Minuteman III solid rocket) built in. The McDonnell Douglas/Johnson & Johnson Continuous Flow Electrophoresis System will consist of Block 3 hardware for the first time—hardware designed for mass production—and the first commercial payload specialist, MacDac's Charlie Walker, will be along to monitor the system. The Large Format Camera will operate for the first time and use its 9" x 18" frames to record high fidelity geophysical views of the Earth. OAST-1, sponsored by the Office of Aeronautics and Space Technology, will carry three solar experiment packages. TELESAT-1 is the third and last of a series of communications satellites sent aloft by Telesat Canada Ltd. to provide voice and TV coverage for a trans-Canadian network. This flight will also see the third trip for the 35mm Cinema 360 hemispheric photographic system and the second for the 70+mm IMAX system. Landing is scheduled for KSC on Flight Day 8.



Three satellite deploys will highlight this August flight, the busiest launch month of 1984. Satellite Business Systems' SBS-D will go off on Flight Day 1, followed by Hughes' SYNCOM IV-2 on Flight Day 2 and AT&T's TELESTAR 3-C on Flight Day 3. The SPARTAN payload is a low cost, deployable, attitude controlled platform which in this instance will be sponsored by the Naval Research Laboratories to conduct observations of X-ray sources within the galaxy. SPARTAN will be deployed on Flight Day 4 and retrieved 46 hours later. The ADSF, or Automatic Directional Solidification Furnace, takes the place of five middeck lockers inside *Discovery* and will conduct basic research into materials processing. The twist here is that the four furnaces in the experiment move along ceramic sample tubes filled with alloys, rather than the tubes moving through the furnaces themselves. In the process, scientists will be able to examine the effects of heating and cooling on the crystalline structure of the alloys. Landing is scheduled to be the first autoland, and will take place at Edwards on Flight Day 7.

Launch: August 30
Duration: 10 Days
Orbiter: 102
Altitude: 190/133/122 n.m.
Inclination: 57 degrees
Crew: Crippen, McBride, Sullivan, Ride, Leestma
Payloads: ERBS, OSTA-3, LFC, SPARX, ORS, IMAX

41-G

This flight will carry the Orbiter *Columbia*, back from major modifications in California, to three distinct orbital altitudes. The Earth Radiation Budget Satellite, designed to study both the Earth's radiation budget (heat gains and losses) and stratospheric particle contents, will be deployed at 190 nautical miles. After the Shuttle moves off, a hydrazine propulsion system will take ERBS to its operational altitude of 325 nautical miles. On Flight Day 2, *Columbia* will descend to 130 nautical miles to accommodate Shuttle Imaging Radar (SIR-B) activities as a part of the OSTA-3 payload. OSTA-3 is essentially a reflight of the same equipment flown on the OSTA-1 pallet during STS-2. On Flight Day 4, the *Columbia* will descend to 122 nautical miles for operations of the Large Format Camera, the SPARX payload and further OSTA-3 experiments. SPARX is essentially a commercial version of the Shuttle Pallet Satellite—the SPAS—which will have flown on STS-7 and Mission 41-B. The SPARX payload will use a modular optoelectric multispectral scanner (MOMS) to photograph select portions of the Earth throughout the flight, and is a three-way commercial venture of Messerschmit, COMSAT and The Steinbeck Group, a New York-based finance company. The ORS is a demonstration of the Orbiter Refueling System, a means of servicing satellite fuel supplies, and will require an EVA during flight.

—Jeff Carr and Brian Welch

Sources: Flight Requirements Office and Flight Manifest Office, NSTSPO; Flight Activity Branch, Flight Activity Planning Section and Payload Support Planning Section, Operations Division, Mission Operations Directorate.

Gilruth Center News

Call x3594 for more information

Plumbing repairs — Tired of costly bills for minor plumbing repairs? Then this class is for you. The class meets Feb. 1 for one night from 7:15 to 10:15 p.m. The cost is \$20 per person.

Drawing fundamentals — This is a beginning drawing class with emphasis on basic perspective, outline and proportion, light, shade and composition and other techniques. The six-week class meets from 7 to 9 p.m. beginning Jan. 24. The cost is \$25 per person.

Electrical repairs — Another how-to class, this offering shows you how to trouble shoot many of the electrical problems around the house. This one-day class meets from 7:15 to 10:15 p.m. Feb. 2 and the cost is \$20 per person, materials included.

Photography — Basic camera techniques are taught in this Tuesday night class which meets from 7 to 9 p.m. beginning Feb. 7 for six weeks. The cost is \$20 per person.

Tennis classes — Beginning tennis is the emphasis here, in this eight-week series which runs from 5:15 to 6:45 p.m. beginning Feb. 13. Another series for intermediates begins at the same times Feb. 15, also for eight weeks. Both classes cost \$28.

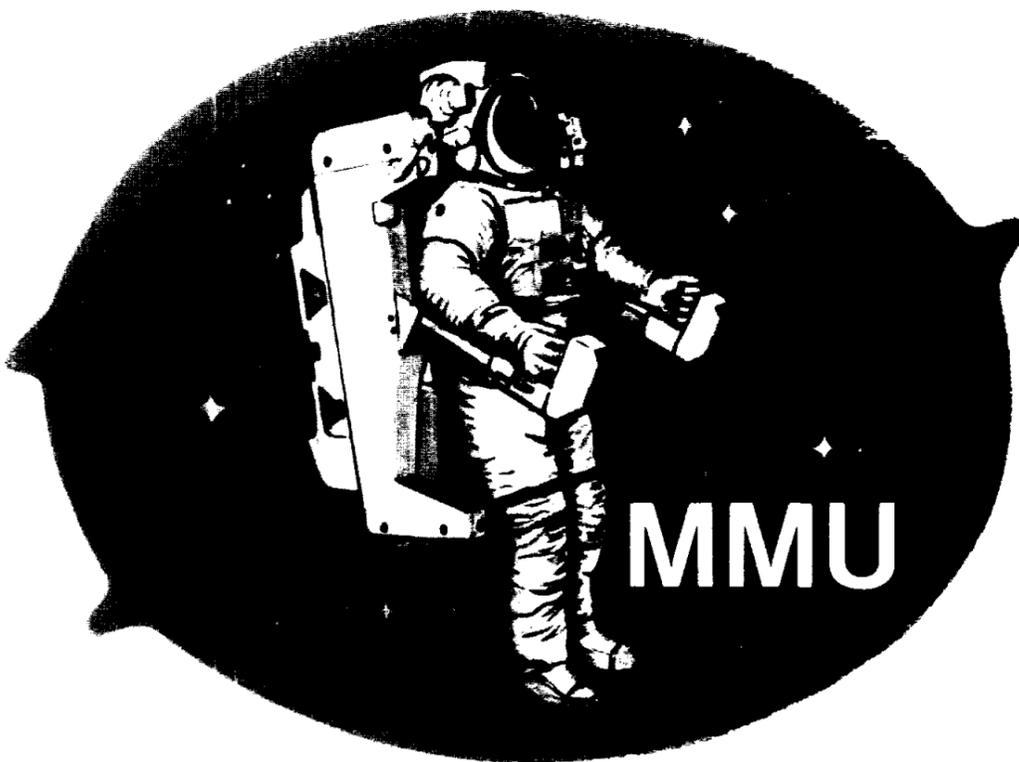
Defensive driving — Learn to drive safely and qualify for a 10% reduction in your auto insurance rates for the next three years. The class is held from 8 a.m. to 5 p.m. Feb. 18 and the cost is \$20 per person.

Childrens movie — The next Rec Center movie for the younger set is "The Dark Crystal," which will be shown from 10 a.m. to noon Jan. 21. The cost of \$1 per person includes popcorn and cokes. Tickets are on sale in the Bldg. 11 Exchange Store.

Race — The next Rec Center race is a 10K or 1 mile race beginning at 8 a.m. Jan. 28. The cost is \$20 per person.

Ladies exercise — Come stretch with the gang for only \$12 per person in this on-going class at the Rec Center, which meets from 5 to 5:45 p.m. on Tuesdays and Thursdays.

Karate — This course meets Mondays and Wednesdays from 5:30 to 7 p.m. at a cost of \$25 per person.



If this patch design looks strangely familiar, it's because the logo for the Manned Maneuvering Unit is a takeoff on the original NASA Meatball logo of yore. First flight of the MMU is set for Mission 41-B, which is scheduled to depart KSC on Feb. 3.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP 3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

For rent: Pasadena area, 3-1-1, fenced yard, \$450 + deposit. Call 944-2962.

For lease: Eldorado Way, 1 BR condo, W/D, new carpet, \$325/mo. plus deposit. Call 486-1906 after 5 p.m.

For lease: Countryside, League City, 4-2-2 on cul-de-sac, near pool, park, tennis, \$575/mo. Call Tim Pelischek, x2276 or 486-6167.

For lease: Townhouse, Clear Lake City, 2-2 1/2, fire, fireplace, custom drapes, all appliances incl. W/D. Call Actkinson, x6451 or 482-7061.

For rent: Galveston-by-the-Sea condo, 2 BR, furnished, for rent by day (2 minimum), week or month. Call Clements, 474-2622.

For rent/lease: Friendswood, 3-2-1, drapes, fenced, near schools, \$480/mo. plus deposit. Call 482-7546.

For lease: Southbend, 3-2-2, fireplace, drapes, 1 year old, \$525/mo. plus deposit. Call 486-7572 after 5 p.m.

For lease: Sycamore Valley/Ellington AFB, 3-2-2, fireplace, cathedral ceiling, open floor plan, fenced, patio, yard sprinkler system, Pasadena Schools, \$600/mo. + deposit. Call 485-1705.

For rent: Barringer Knoll, 2 BR apt., ceiling fan, security lock, W/D hookup, \$415/mo. + deposit. Call 334-4395 after 5 p.m.

For sale: Lot on Lake Travis, Lago Vista area, \$7,000, \$1,600 down & take over payments of \$98.29/mo. Call 451-5044 or 921-7212.

For sale: House, Dickinson, 2 BR, 1 bath, large den, large patio, fenced yard, central heating and AC, \$38,000. Call Rosa Jones, 337-3007.

For sale: Forest Bend, clean 3-2-1, large den, fenced yard, large dog run, VA assumption 8.75%, \$52,500. Call 482-1106 after 5 p.m.

For sale: Lot on golf course at Sam Rayburn, deal you can't refuse. Call Jim Poindexter, x4241 or 474-7769.

For sale: League City, 68' x 170' lot, all utilities, near high school, \$8,500, terms. Call 1-585-8162.

Cars & Trucks

1980 Olds Omega, 6 cyl., AC, vinyl roof, sun roof, cruise, AM/FM/tape, new transmission, \$3,400. Call Norris, x6171 or 488-2276.

1978 Olds Cutlass Supreme Brougham, 2 dr., PS/PB, AC, V8, AM/FM, cruise, 60K mi., excellent condition, \$4,200. Call Tim, 488-6389 after 4:30 p.m.

1977 Datsun B210 hatchback, 5 speed, AC, new tires, & paint, excellent running condition. Call 554-4306 after 4 p.m.

1981 El Dorado, loaded, CB, black & gold vinyl top, low mileage, mechanically sound, new tires. Call Poindexter, x4241 or 474-7769.

1979 Cadillac El Dorado, 1 owner, 27K miles, like new, \$8,000. Call between 8 a.m. & 5 p.m., 473-9311.

1979 Cadillac Coupe de Ville, new tires, air, all power, AM/FM cass., clean, 62K mi. Call Noel, 332-4793 or x4141.

1977 Pontiac Firebird, two-tone blue, V-8, PS, PB, air, tape deck, excellent condition, \$3,300. Call 482-7546.

1982 Firebird S/E, auto, T-tops, power everything, tilt wheel, AM/FM/cass., 31K mi., \$8,900. Call Mark, x6226 or 554-4847.

1973 Dodge Challenger, needs work, bent frame, missing fender, good motor, \$150. Call Don Larson, x3205 or 481-2195 after 5 p.m.

1963 "Trick" Baja bug, rebuilt eng., susp., brakes, big TAs, very yellow ext., custom int., stereo, \$2,800. Call Huber, x5531 or 554-2992.

1982 Dodge pick-up with short bed, 4 speed trans., air, AM-FM cassette stereo, like new condition, \$6,400. Call 491-8720.

1980 Toyota, Celica Supra, liftback, leather seats, loaded, excel. condition, extra clean, new battery, recently tuned, \$6,800. Call 1981-1766.

1981 Pontiac Grand Prix Brougham, Diesel, loaded, immaculate, 45K mi., \$6,750 or best offer. Call 538-2107, League City.

1981 Pontiac Grand Prix, 45K mi., 4 new tires, new brakes & tune up, AM/FM stereo, V8, excellent condition, \$6,500. Call Sandra, x4239 or 471-0136.

1973 VW bug, 39,600 original mi., like new condition, \$2,900. Call Pat, x2337 or 554-6368.

Ford Mustang Grande, auto, 351-V8, AM/FM/stereo/8 track, AC, good condition, \$1,395 or best offer. Call Ray, x6343 or 471-6814 after 5:30 p.m.

1978 Plymouth station wagon, 6 cyl., auto trans, A/C, AM/FM/stereo, lots of extras, \$2,800. Call Lee, 488-5906.

1983 Porsche 944, Alpine white/brown int., 15K mi., sunroof, Blaupunkt cassette. Call John, x2596.

1982 Ford F100 XLT pickup, air, PS/PB, 4 speed overdrive, cruise, dual tanks, excellent condition, \$7,000. Call 488-4915.

1977 Monza town coupe, 46K mi., new 4-cyl. engine, tires, clean, yellow/white, auto, PS/PB, tilt, \$1,600. Call Pavelka 482-7461 or x5161.

Late 1980 Ford F100 pickup, excellent condition, AC, PS/PB, 3 spd AM/FM/tape, more, \$4,900. Call Barry, x5156 or 328-5017 after 5:30 p.m.

1978 Toyota Celica liftback, very good condition, \$3,200. Call Art Campos, 538-4773.

1981 Subaru GLF, 5-sp., air, 2 dr., only 26K mi., \$4,395. Call 486-8998 after 5 p.m.

1978 VW Rabbit Diesel, AM/FM stereo, AC, good condition, best offer. Call Joe, x4014 or 480-7671.

1977 VW Rabbit, 2 dr., AC, AM/FM, good condition, \$2,200 or best offer. Call Cindy, x4231 or 471-8559.

Boats & Planes

Scullers only: 24' competition 2-man river shell, moves on lakes like a Maserati, top sports aerobic, Clear Creek Basin team. Call Gene Horton, x6130.

16' Sooner craft deck boat, 120 hp, I/O, Dilly trailer & new top, never in salt

water, stored indoors, \$3,000 or best offer. Call T. Ward, 488-5445.

Wellcraft D-20 Steplift, 1982, 470 Merc cruiser, Sportsman drive-on trailer, always in dry storage, \$12,000. Call 464-1981 days, 496-1816 evenings.

Boat, beautiful yellow 22' Searay Cuddy Cabin 190 OMC, SS-prop, power trim, captains chair, etc., tandem trailer, elec. winch, \$11,000. Call Sterling, x4524 or 486-4364.

Cycles

Hutch pro-racing dirt bike, 10 mo. old, perfect condition, cost \$475 plus, will sell for \$300. Call Ron x3526 or 944-6590.

1981 Kawasaki 305 CSR, low mileage, \$800 or best offer; 1978 Kawasaki KZ-1000, make offer. Call JJ, x3916.

1980 Yamaha YZ100 dirt bike, mint condition, \$450. Call 474-3507.

1983 Honda 750 Shadow, 3,300 mi., \$2,850. Call 996-9179.

Audiovisual & Computers

Bell & Howell Slide projector model 960, works but needs adjustment, spare lamp, 2 trays, \$45; carousel trays for 960, \$2 ea. Call 488-5580 after 5 p.m.

Complete S-100 computer system, includes extras, over \$1,500 invested, make offer. Call 332-3335, League City.

New Atari 400 with Space Invaders, \$70. Call Mike at x3377 after 4 p.m. or 476-0672.

IBM Selectric I/O typer. \$75. Call Chuck Taylor, 488-5877.

Notice: Commodore Houston User Group (CHUG) area special interest meeting, Nassau Bay City Hall, 7 p.m. monthly, 1st Wed., JSC & contractors invited.

19" color TV, good cond., \$50; Canon 8 mm movie camera w/acc., \$25. Call 488-3966.

Nikko Beta 40 preamp, moving-coil input, separate record & output switches, adjustable phone capacitance & resistance, mint, \$350. Harman-Kardon 770 power amp, 65 watts/channel, mint, \$290. Sell both for \$575. Call Mitch, x4771 or 486-0958.

Photography

Top line Polaroid SX-70 camera with electronic flash & carrying case, \$100. Call Gorman at x2447.

Musical Instruments

Fender style bass guitar, excellent condition, see to appreciate, only \$150. Call Mike, x3377 after 4 p.m. or 476-0672.

Bundy clarinet with case & stand, excellent condition, used 4 months, \$215. Call Marie, x3606 or 488-2870 after 5 p.m.

Spinet piano in excellent condition, \$1,450. Call 487-3795.

5-String banjo, Stewart-MacDonald, gold plated with hardshell case, \$350 CLT. Call Chuck Taylor, 488-5877.

Upright piano, American tiger oak w/ivory keys, clawfoot stool included, \$525; King student trombone, \$75. Call 482-7031.

Household

Dryer. Call Madeline, x2303.

Bedroom set, solid oak, std. size headboard, night stands, chest, vanity, total 14 drawers, \$225. Call 474-5610 after 5 p.m.

New Toastmaster pushbutton oven-broiler, self-cleaning, 1200 watts, 120 VAC, \$45. Call 921-7212.

Wards's Signature deluxe upright freezer, 16.6 cu. ft., white, very good cond., \$280; Philco side-by-side frost-free refrigerator, avocado, good condition, \$100. Call 488-6389 after 4:30 p.m.

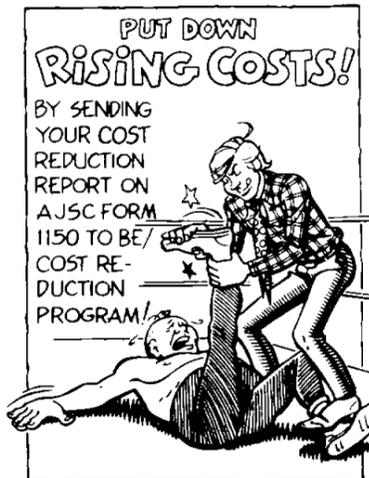
15 cu. ft. upright freezer, \$50; gasoline generator, Fairbanks-Ward USA, 120/240 volts, single-phase, 4200 watts, almost new, \$600. Phone Art Campos, 538-4773.

Spanish velour 2-pc. couch with corner slate table, lamp & coffee table included, eye-catching, \$495. Call Dave, x5365.

Full size bed, \$35; 3/4 bed, \$25; sofa, \$10; chair, \$5; misc. Call 332-0047.

4 rattan/chrome chairs, 1 yr. old, \$35 each; recliner, \$25; old gas dryer, \$15. Call Brenda, x5085.

Round maple dining table & 1 leaf, good condition, \$75. Call Nancy, x2858.



Wanted

Electric trains. Call Don, x2449.

Oscilloscope, prefer dual trace 10 mHz+, will consider single trace 5 mHz if price & condition both good. Call C. Parker, x3321 or 946-4628 after 5 p.m.

Car in good condition for student, \$2,000 range. Call Keith, 474-3507.

Datacassette for Commodore 64/Vic 20. Call Sharon, x4231 or 482-6046.

Roommate to share 2 BR, 2 bath condo, \$300/mo., bills paid. Call Rick, x5341.

Retired couple to spend time in Piney Wood country in return for caring for property & animals. Call 554-4133 after 5 p.m.

Want to lease townhouse in Nassau Bay, approx. March 15. Call Thompson, 332-2229.

Want to lease Cessna 152 or 172 plane, terms negotiable, great tax advantages for '84. Call Mark, x4436 or 554-2538 after 5 p.m.

Carpools

Want to join/form carpool from Bearcreek Park/Hwy 6 area, 7:30 a.m. to 4 p.m. shift. Call George, x4927 or 463-6704.

Found

Lady's designer bifocal glasses found in parking lot of bldg. 226 about October 1983. Call LeAnne, x3803.

Miscellaneous

Springfield "03" military issue 30.06 rifle in mint condition, sporterized walnut stock with 3X Savage scope, leather mil sling, bolt action, 5-shot, plus 1, Rock Island arsenal 1918 series, a collector's item & hunter's special, \$375. Call Alter, x5111 or 480-0202.

Coleman camper, sleeps 7, extras, excellent condition, \$2,500. Call 482-7546.

Larry Dyke limited edition prints. Call 482-7546.

4 tires, 155SR13 Michelin steel radials, almost new, asking \$80 or make offer. Call x2361 or 488-4110 evenings.

Sears 10" radial arm saw, 2 hp, extra blades, DADO carbide, like new, \$250; jointer-planer, new from AMT, \$95. Call 643-8170.

Wheelchair. Call Sylvia, 744-7934.

Ducks. Call Gennie, 948-7973.

Ford 289 engine, many new parts, make an offer. Call Thompson, 332-2229.

Ping-pong table with paddles & net, \$25. Call 482-7042.

Continental Airline round trip companion ticket, good till Apr. 15, \$100. Call Doris Wood, x5264, x3261 or 333-2373 nights.

Man's full length leather coat, size 42, very nice, \$85. Call 488-6389 after 4:30 p.m.

Car speakers, 6" x 9", 200 watts, 40 oz. magnet, new, in box, never used, all offers considered. Call Ed, x6226.

Cord seasoned oak fire wood delivered & stacked, \$150. Call Willie Braxton, 486-8815 or 486-8816.

Little girl's 24" bike, completely re-conditioned, real neat, \$40. Call Art, x4188 or 333-4458.

5 lb. shelled pecans, \$3/lb.; 10 gal. fresh honey, \$10/gal. Call Clarence Blume, x5159 or 554-2911.

Wrought iron, black hand railing 14' long, & wall divider 8' x 6', \$250 for both. Call Dave x5365.

Man's wedding band, 14K yellow gold, 4 diamonds, cost \$600, asking \$450. Call Diane, x2558.

Black cover to fit 1980 Celica ST or GT, like new, \$60. Call Tanya, x7236 or 434-8741 after 6 p.m.